Occupational Outlook Quarterly

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- What's Ahead for College Graduates
- Careers in Business Management
- Employment Outlook for Astronomers

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VETERANS ADMINISTRATION

Occupational Outlook Quarterly

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This publication is issued to provide counselors with current information on employment trends and outlook, based primarily on the continuous research and statistical programs of the Bureau of Labor Statistics. It supplements and brings up to date information in the Occupational Outlook Handbook. It is prepared with the advice and assistance of the --

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WHAT'S AHEAD FOR COLLEGE GRADUATES

by Helen Wood

What is the job outlook for college graduates of the 1960's? Will opportunities in the professions and other occupations customarily entered by college graduates increase as fast as the number of college-educated people seeking jobs, or will many new graduates be forced to enter other types of work? Which professions will grow most rapidly and offer the best employment prospects?

These are questions of obvious importance to young people and their counselors. They are of interest also to many other persons, aware of the impending sharp rise in the college-age population and the possibility that this may lead to stiff competition for jobs among college graduates.

Another series of questions having a very different import are asked by people concerned about the current personnel shortages in scientific and other fields. Will there be enough college graduates to meet the country's increasing need for highly educated, creative personnel? How much should college and university facilities be expanded? Should greater efforts be made to acquaint young people with the career opportunities in science, engineering, and other professions where there are now personnel shortages?

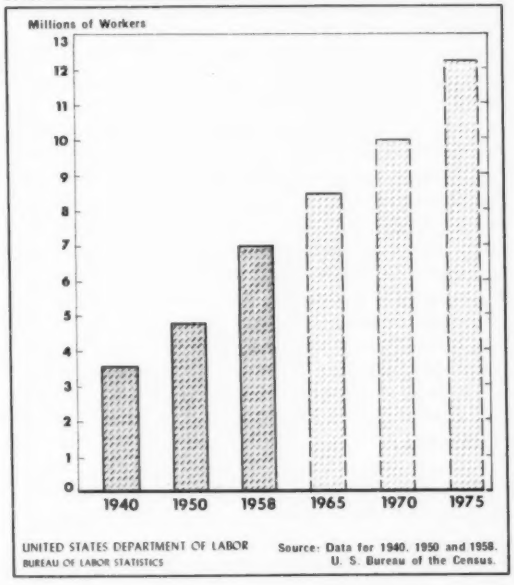
In a world full of uncertainties--political, economic, and technological--it is not possible to give final answers to such questions. However, studies of the employment trends in the professions and other occupations and of the patterns of employment of college graduates, recently completed by the Bureau of Labor Statistics, throw considerable light on both sets of questions. This article discusses a few of the findings of these studies, which young people and their counselors may find helpful in their educational and vocational planning.

Growth in Professional Employment

The rapid growth in professional employment is a trend already well known to readers of this magazine. Employment has increased faster since World War II in professional and related occupations than in any other major occupational group. In only 8 years, between 1950 and 1958, the number of workers in professional and kindred jobs increased by 46 percent, whereas in clerical occupations, the second fastest growing occupational group, the rise was only 24 percent.

Altogether, nearly 7 million people were employed in professional and related work in 1958, compared with 4.8 million in 1950. (See chart 1.) By 1975, according to the Bureau's

Employment of Professional, Technical, and Kindred Workers 1940-58 and Projections to 1975



occupational outlook studies, as many as 12 million people may be employed in professional and related jobs. This means that, in 1975, 1 out of every 7 civilian workers may be in a professional or kindred occupation, compared with only 1 out of 10 in 1958, and 1 out of 12 in 1950.

All the recognized professions--teaching, engineering, the law, the ministry, the various health professions, the natural and social sciences, and many others--are included in the figures for professional and related occupations. In addition, this broad occupational group includes a large number of technical and kindred occupations--for example, the many types of technicians who work with engineers and scientists and with members of the health professions. Such occupations typically require less education than is needed for fully professional work, although many experienced technicians have jobs demanding considerable technical training.

The factors responsible for the gains in professional and kindred employment are as numerous and varied as the occupations which make up the group. The growth of some professions is closely related to increases in the population. This is especially true of teaching and of the health professions, including physicians, dentists, nurses, and therapists. The shift in population from farms to cities is a continuing process which has tended to increase the demand for lawyers, social workers, and other professional personnel qualified to deal with social problems. The increasing urbanization of the population, coupled with the gradual reduction in hours of work and with rising levels of personal income, is also creating a growing demand for personnel in cultural and recreational fields. Thus, employment has been rising among librarians, recreation leaders, and radio and television technicians, to cite a few examples.

The increasing magnitude and complexity of business organizations have been major factors in the growth of another large group of professions. Accountants, personnel workers, market research specialists, economists, and statisticians are among the types of professional personnel who have benefited from the expansion of American business and industry and also, in some cases, from the growth in government activities.

To understand the rising employment of scientists, engineers, and the technicians who assist them, one must study still another set of factors--chief among them, the increasing complexity of industrial and military technology and the recent vast increases in expenditures for scientific and engineering research and development. The country is now spending more than $10 billion a year on research and development, compared with $5.4 billion in 1953 and less than half a billion annually before World War II. Obviously, the level of future expenditures for research and development, by both industry and government, and the way in which the funds are distributed among scientific fields will play a great part in determining the future demand for personnel in scientific and technical professions. These factors will also have an indirect effect on the employment of patent attorneys, accountants, personnel workers, and other professional groups connected with business and government administration.

The conclusions with regard to employment prospects in the various professions, arrived at through the Bureau's occupational outlook studies, take into account the whole gamut of factors affecting each field. In general, these studies indicate that employment will rise to some extent in all major professions. However, some professions will grow much faster than others, as indicated by the following highlights of the trends anticipated in a few fields.[1]

Engineering, which has been one of the fastest growing occupations in re-

[1] For a discussion of the employment prospects in professional and other occupations not mentioned in this article, and for further information on the fields here covered, see the Occupational Outlook Handbook, 1959 edition (described on page 2 of this magazine).

cent decades, is expected to continue its rapid expansion. By 1975, engineering employment may be around 2 million, more than double the 1958 figure of approximately 850,000.[2]

The number of scientists in all fields, estimated at around 300,000 in 1958, may also more than double between 1958 and 1975. Mathematics and physics will be among the fastest growing fields. The largest scientific professions--chemistry and the biological sciences--will also grow rapidly, though not as fast as the two fields just mentioned. Still others—for example, geology—may have considerably slower growth.

In school teaching, the largest of all professions, employment will probably not increase as fast as in engineering and the sciences. However, many new positions will be added, as a result of the rising school-age population and the tendency for more young people to complete high school. Our projections suggest that the total number of elementary and secondary school teachers in the United States may reach 2 million by 1975, about one-fourth more than in 1958-59.

In college teaching, personnel needs will grow much faster than this, in relative terms, though the number of positions involved will be smaller. In 1958-59, the total number of full-time college and university teachers in the country was about 200,000; by 1975, this number will need to be more than twice as great, to take care of the unprecedented numbers of young people expected to be clamoring at college and university doors.

In medicine and the other health professions, personnel needs will mount also, as a result of continued population growth, the increasing proportion of people in the older age groups where the need for health services is greatest, and a variety of other factors. However, in these professions to a greater extent than in many others, any realistic appraisal of employment trends must take into account the training facilities likely to be available. The increase in such facilities will be moderate, according to plans currently known. Thus, the number of medical school graduates is expected to rise from about 6,900 in 1958 to 7,400 by 1965. The U.S. Public Health Service estimates that by 1975, the number of physicians in the United States may be close to 300,000, about 30 percent more than in 1958. This would be a much slower rise than is anticipated in many other professions. Furthermore, according to the Public Health Service, the ratio of physicians to population will decline significantly in the next two decades unless training facilities are increased more than is now planned.[3]

The extremely rapid growth in technician occupations is another noteworthy trend. Employment of technicians has mounted very fast since the beginning of World War II, owing partly to the shortages of doctors, dentists, engineers, and scientists and the consequent need to relieve these professional workers of tasks which can be performed by less highly trained persons. The growth of technician occupations has a more fundamental cause, however. It is due basically to the increasing complexity of modern technology, which has created a need for workers who have both manual skill and basic scientific knowledge.

By 1958, the number of technicians working with engineers and scientists had reached about 850,000, according

[2] It is important to note that this and other projections of future employment given in this article represent rough orders of magnitude only. Like all economic projections, these estimates are based on a series of assumptions. It is assumed, for example, that there will be no wars or severe depressions and no sharp cutbacks in Government spending for defense, and that scientific and technological advances will continue at about the same rapid rate as during the last decade. The BLS plans to reappraise its employment projections at intervals, to take account both of new data on employment trends and of any modifications in the underlying assumptions which may be dictated by changing political or economic conditions.

[3] Health Manpower Source Book, Section 9, Physicians, Dentists, Nurses, Washington, U.S. Department of Health, Education, and Welfare, Public Health Service, 1959, p. 37.

to a rough estimate. It is anticipated that during the next 15 years, employment will increase at least as fast in these technician occupations as in engineering and the sciences--more than doubling by 1975. Technicians in health fields will also have rapidly growing employment opportunities, since the amount and complexity of the technical work done in hospitals and medical and dental laboratories mounts year by year.

Total Personnel Needs in the Professions

In assessing future employment opportunities and personnel needs in an occupation, one must consider not only the number of new positions likely to be created, but also how many newly trained workers will be needed to replace those who retire, die, or transfer to other fields of work. In general, the larger the occupation and the older the workers in it, the greater the number of entrants needed to make up for personnel losses. Replacement needs are also relatively high in occupations employing a large proportion of women, who are likely to stop working upon marriage or the birth of their first child.

Because of the many women teachers, especially in the elementary grades, school teaching is one of the professions with high replacement needs. According to estimates the Bureau regards as conservative, more than 2 million new teachers will be required as replacements between 1958 and 1975, about five times as many as are expected to be needed to staff new positions. This means that, altogether, about $2\frac{1}{2}$ million new teachers will have to be trained and recruited during the 17-year period, of whom approximately two-thirds will be needed for grades kindergarten through 8.

In the medical profession, also, replacement needs are an important factor in personnel requirements. Approximately 125,000 new doctors are expected to complete their training between 1958 and 1975 (according to present plans regarding medical school facilities). Well over half of these young physicians will be needed, however, to replace those retiring or dying--who number about 4,500 annually. This is, of course, one of the reasons for anticipating only a moderate increase in the number of doctors in the country.

On the other hand, in rapidly growing professions employing many young men, replacement needs are relatively small. In engineering, for example, it is estimated that only about a fourth as many new workers will be needed to make up for retirements and deaths as will be required to fill new positions. In addition, some new personnel will be needed to replace engineers transferring to other types of work, but the number of openings thus created will also be relatively small.

What will replacement needs add up to in the professions and kindred occupations as a whole? The Bureau's studies suggest that at least 5 million new entrants into professional, technical, and kindred occupations will be needed between 1958 and 1975, to offset retirements, deaths, and transfers to other fields of work. Thus, a total of about 10 million new workers will have to be trained and recruited, if employment in professional and related occupations is to grow from 7 million in 1958 to 12 million in 1975, as indicated by the Bureau's projections of personnel needs.

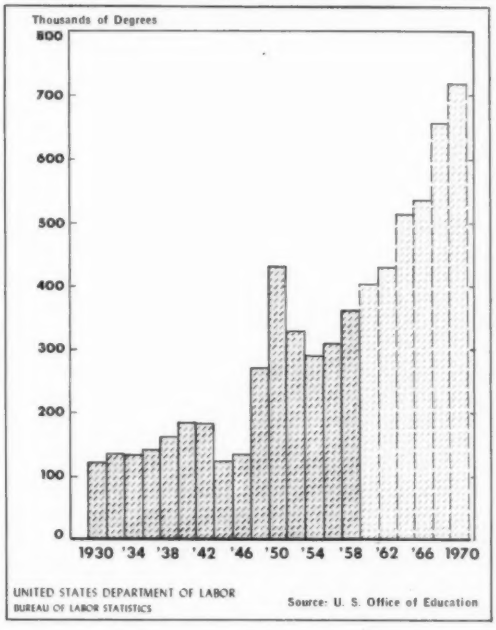
Numbers of College Graduates and Their Employment Patterns

In view of this vast prospective demand for new professional workers, it is fortunate that a great increase in college graduations is in sight also. College enrollments are already higher than ever before, because of the rapid rise since World War II in the proportion of young people attending college. When the great numbers of postwar babies reach college age, enrollments will mount more spectacularly and graduations will show corresponding increases a few years later.

The U. S. Office of Education estimates that the numbers of bachelor's degrees granted may rise from 366,000 in 1958 to about 513,000 in 1964, and 718,000 in 1970 (chart 2). These estimates allow for some further increase in the proportion of young people completing college, as well as for the great rise certain to take place in the college-age population. They also assume that teaching staffs and facilities in colleges and universities will be expanded fast enough to take care of the increasing numbers of qualified students wishing to enroll. Beyond 1970, further rises in enrollments and graduations are expected, on these same assumptions. Altogether, in the period 1958-75, the number of bachelor's degrees granted may reach 10 million.

The reader will note that this estimate is the same as the figure of 10 million new workers expected to be needed up to 1975, to staff new positions and take care of replacement needs in professional and kindred occupations. The correspondence between the two estimates is a mere coincidence, however. Not all professional jobs will be filled by college trained workers, and by no means all college graduates will enter professional employment.

Bachelor's and First Professional Degrees Conferred 1930-58 and Projections to 1970



To consider the latter point first, some people, chiefly women, are interested in a college education primarily as preparation for everyday living and may not utilize this education on the job.[4] In addition, many positions outside the professions require college-trained personnel.

Professional and kindred occupations do represent by far the largest field of employment for college graduates, however. In 1957, 63 percent of all workers with 4 or more years of college education were in professional and related jobs. The next largest group, 16 percent, were in administrative and managerial positions (outside farms). The remainder were distributed as follows: Clerical and sales workers, 14 percent; craftsmen, foremen and kindred workers, 3 percent; other occupational groups, 4 percent.

That more and more college graduates are entering professional jobs becomes apparent when these figures are compared with the corresponding ones for earlier years. Among workers with 4 or more years of college, the proportion in professional and kindred jobs was 60 per-

[4] It should be noted that, even among women, persons who never use their college education in paid employment represent a small minority of all college graduates. According to a study conducted by the Women's Bureau of the U. S. Department of Labor, in cooperation with the National Vocational Guidance Association, more than four-fifths of the women who graduated in June 1957 were employed 6 months after graduation, and of these about four-fifths were in professional or related work, chiefly teaching. Many women drop out of the labor force upon marriage or the birth of their first child--a loss of personnel allowed for in the figures on replacement needs given earlier in this article. However, the proportion of women who return to employment in their thirties or later is rising. For a discussion of this last point, see Stuart H. Garfinkle, Marriage and Careers for Girls, in The Occupational Outlook, December 1957, pp. 11-16.

cent in 1950, somewhat below the 1957 figure.

The more rapid growth in professional employment than in other fields of work is one reason for this recent trend. Another is the narrowing in the areas of professional and related employment which can be entered without a college degree. In accounting, for example, educational standards are rising, and college graduates are increasingly preferred for the more desirable entry positions and for advancement to higher level jobs. In engineering, some individuals without college degrees still succeed in qualifying for professional positions on the basis of their experience and personal characteristics, but opportunities to do this are apparently becoming less numerous. In this and most other professions, there is growing emphasis on a college diploma--and often on postgraduate training—as the standard educational preparation for employment.

The demand for college graduates is increasing also in administrative, sales, and even clerical work. College-educated people are now being given preference for many executive-trainee and other positions in industry and government which either did not exist a few decades ago or would have been filled by employees selected on the basis of their experience and personal characteristics rather than of their educational background. This emphasis on a college education will probably be reinforced in the years ahead--in view of the growing complexity of modern industry and technology, which is constantly increasing the amount of knowledge and skill required for efficiency in many fields of work.

Thus, the future holds promise of expanding opportunities for college-educated people in many fields. Largely for this reason, the proportion of college graduates entering the professions is likely to show only a moderate rise--by no means as large an increase as might be expected if it were not for the competing opportunities in other fields. In the period 1958-75 as a whole, the professions and related occupations will absorb about 60 to 65 percent of all college graduates, according to the Bureau's projections. This implies that the total number of new graduates entering professional and related employment during the 17-year period will be between 6 and 7 million.

It thus appears, further, that 3 to 4 million nongraduates should find opportunities to enter professional, technical, and related occupations between 1958 and 1975--since the Bureau expects that, altogether, about 10 million new workers will be needed in these occupations. Many of the openings for nongraduates will be in semiprofessional positions—for example, in the fast-growing technician occupations. Many others will be in professions--such as those of the writer, actor, and musician--where special talent and skill outweigh high educational attainment as employment qualifications. However, some exceptional individuals who are not college graduates will no doubt continue to achieve professional status in engineering, accounting, and other fields where a college degree is regarded increasingly as the standard educational requirement.

Some Implications

The picture presented in this article should be a reassuring one to people concerned with either of the sets of questions posed in the introduction. The demand for college-educated people is expected to increase fast enough in the professions and other fields to provide employment for the numbers of college graduates likely to be seeking jobs, and no general shortage of college-trained personnel is anticipated in the coming decade. The Bureau's projections suggest, in fact, that personnel supply and demand will be approximately in balance in professional and related occupations as a group over the 1960 decade as a whole.

These favorable conclusions carry with them a number of assumptions and provisos. As already indicated, the estimates assume continued high levels of general economic activity, no war, and no sharp reduction in the defense

program. They also assume a marked expansion in college and university faculties and facilities.

Furthermore, it would be a mistake to conclude from the overall figures discussed here that all will be well, personnelwise, in every profession and at every professional level. The demand for personnel will grow much faster in some professions than others, as already indicated. Whether the supply of personnel in each field will keep pace with the varying demand will depend on two uncertain factors--the rate at which educational facilities are expanded, and how many young men and women elect to prepare for each profession.

A problem of fundamental importance and difficulty for our democratic society, as well as for the guidance profession, is how to meet the Nation's needs for specialized personnel and still maintain freedom of choice for the individual. This problem can be approached from several directions, though it has no easy solution. First, there is need for continual efforts to appraise future demands for personnel in the various fields, and to compare these demands with the prospective supply of trained workers.[5] This information should help to guide educational institutions in planning the required increases in staff and facilities. If widely used in vocational guidance, it can help to insure that young people's educational and career decisions are illumined by knowledge of the opportunities and personnel needs in the various fields of work.

One further problem needs to be stressed--the continuing shortage of highly qualified, creative personnel in almost every field. Although the total number of college graduates is expected to rise sharply, this provides no assurance that the need for topflight workers will be met. It is a national loss, as well as a personal one, that many gifted young people do not go to college and therefore fail, in most instances, to achieve their maximum intellectual potential. By helping to identify such boys and girls early in their school careers and to motivate them to obtain a higher education, counselors can contribute greatly to the strength and welfare of this country.

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[5] The Bureau of Labor Statistics' continuing program of occupational outlook research is designed to provide much of the needed information with regard to personnel requirements and the supply of personnel in the professions and other major occupations. It is important that such information be up to date, since projections of future personnel needs are necessarily tentative and require reappraisal in the light of new technological developments and changing economic and political conditions, and since the numbers of young people who take training for different fields may fluctuate considerably in response to shortrun factors. The Bureau therefore plans to issue revised editions of the Occupational Outlook Handbook periodically, and also, between editions of the Handbook, to report in this magazine on new developments affecting the employment outlook.

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CAREERS IN BUSINESS MANAGEMENT *

by William Paschell

Success stories about corporation presidents who quit school and started work as messengers in their companies appear now and then in magazines and books. Such stories make fascinating reading and lead boys and girls to dream of similar accomplishments. However, young people should know that the "self-made" man may soon become a rarity. It is increasingly difficult for persons without a formal educational background to move up through the ranks of a company to top management positions. Many modern businesses have become so complex that new entrants must, in many cases, have preparation in some specialized field. For meaningful career planning, young people interested in management positions need to know as much as possible about the nature of the work to be performed and the training required. This report was prepared to provide an overall view of the different types of management positions, the education and other qualifications required for entry, the ladders of advancement, future employment prospects, earnings, and other aspects of administrative work in private industry.

Nature of the Work

Business management is one of the largest fields of employment for young men with college degrees; it also offers numerous opportunities for those with less education. Approximately 3 million salaried workers--85 percent of them men--were employed in 1959 to manage the business activities of enterprises ranging from aircraft manufacturing to zinc mining. In addition, many persons designated as professional workers such as engineers, scientists, and accountants, also have administrative responsibilities. Likewise, some foremen and supervisors in factories or offices may perform functions which overlap managerial activities. There are also large numbers of proprietors who carry on all or a part of the activities necessary for the management of their own businesses. However, this report is limited to a discussion of salaried management workers in private industry.

The management setup differs widely among companies, depending on the size of firm, volume and type of business, and a variety of other factors. Regardless of such differences, most business firms hire young people as management or business trainees in order to insure an adequate supply of experienced personnel to fill vacancies as they occur at higher levels. Most large companies recognize two levels of management positions above that of supervisor and manager-trainee--the middle-management group and the top-level executives and officials. In the biggest companies, a typical managerial setup would include a president, several vice presidents--each in charge of one or more broad functions, such as production, sales and marketing, or finance--and several middle or department managers who report to the vice president in charge of their area of work. A department head may have several managers in specialized areas. For example, the labor relations manager, hiring and placement manager, wage and salary administrator, training manager, director of safety, and pension plan manager may report to the head of the personnel and industrial relations department.

*This article is a condensation of a report, "Careers in Business Management," prepared for the Veterans Administration for use in their vocational rehabilitation and education program. The complete report, to be published as a bulletin in the near future, will contain a detailed discussion of entry jobs and lines of advancement in managerial work in the following departments: Finance and accounting, personnel and industrial relations, production, research, sales, market research, advertising, public relations, purchasing, traffic, and legal.

Senior staff member interviews applicant for business-trainee job

Middle-management personnel are responsible for operating their departments at peak efficiency. To do this, they must usually apply their knowledge of one or more specialized fields—accounting, economics, statistics, and engineering, to name a few—and utilize their practical business experience to make decisions on a variety of nonroutine problems within the framework of company policy. They must also have a broad understanding of such matters as costs, personnel practices, methods and procedures, and other matters related to their work. For example, a market research manager may have to draw up estimates of project costs, participate in interviewing and hiring personnel, and assign work to a staff of economists, statisticians, and others. As work progresses, he may evaluate and make a written report on studies made by the staff, discuss the findings with top executives, and make recommendations for changes in products, plant location, or other company policy.

Top-level executives set company goals and make major decisions on companywide policy. They may decide, for example, how the company should prepare to meet customer demands 5 or 10 years hence; whether new plants should be built and, if so, where and how they should be financed. Top company officials also make decisions on broad organizational problems. They identify the major functions to be performed, assign them to the various department managers, and clearly indicate the authority and responsibility for getting the work done. In many companies, final policy decisions on major problems are made by committees of high-level officials including the presi-

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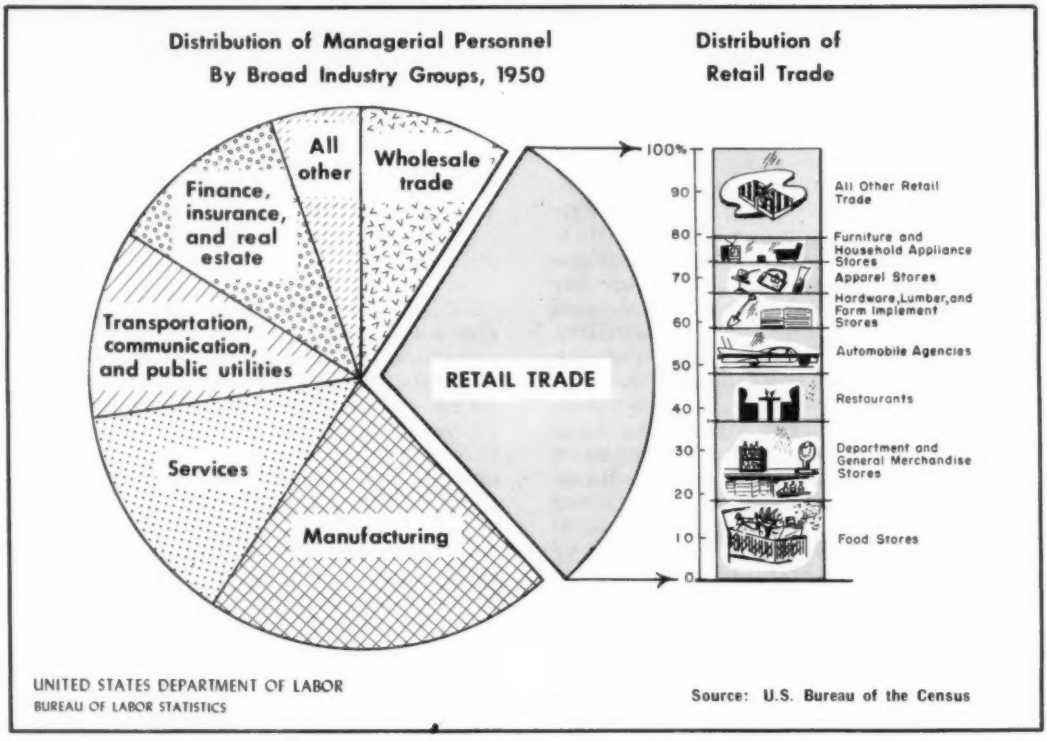
dent, who, in turn, reports to a board of directors.

Where Employed

Every industry employs some management workers. However, the greatest proportion of such workers (nearly 30 percent in 1950) are employed by retail trade establishments. (See chart.) Food and department stores (including general merchandise stores) together employ more than a third of all retail management personnel. Among these workers are thousands of buyers and heads of merchandise departments, as well as many other persons who perform managerial functions but who do not have the title of "manager." Other retail establishments employing large numbers of management workers are restaurants and other eating and drinking places, and automobile agencies and accessories stores.

Manufacturing firms provide employment for about one-fifth of all management personnel. Large manufacturing establishments have a wider range of management jobs than do most other types of businesses. In addition to managers in such functions as personnel, finance, and advertising, which are carried on in most types of businesses, manufacturing companies generally employ managers in a variety of planning and production operations, in basic and applied research, purchasing, transportation or traffic functions, marketing, and sales.

Retail Trade Is the Largest Area of Employment for Managers . . . .



Other broad industry groups employing many management workers are services (including automobile and other repair services, business services, hotels and other personal services, entertainment services, and educational and other professional services), transportation, and the finance-related industries.

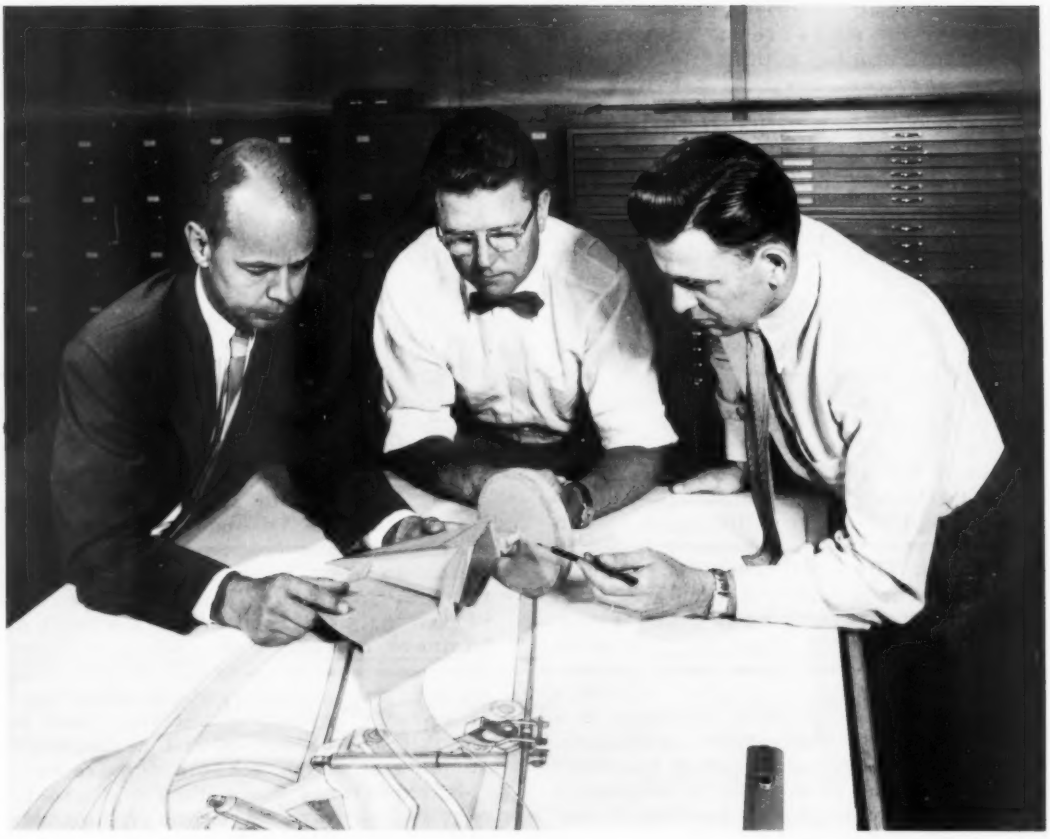
Although the largest industries employ the greatest number of management workers, these industries do not necessarily have the greatest proportion of management employees in relation to their total employment. The finance-related industries (banking, insurance, and real estate) have the highest proportion of managerial-type personnel--one manager for every six workers. On the other hand, the manufacturing industries, as a group, employ only 1 manager for every 29 workers. A major reason for the difference in ratios is the existence of many thousands of small insurance agencies and small branch banks each requiring the services of one or more managers, whereas, manufacturing companies usually employ large numbers of workers in a plant and need relatively few managers. In addition, many management functions in factories are performed by engineers, foremen, and others who are not classified as managers.

Training and Other Qualifications

Inexperienced young people are seldom able to enter managerial positions directly. However, to an increasing extent, large companies recruit college graduates specifically as business-trainees. Each year, company representatives visit colleges throughout the country and interview students who are interested in jobs that may eventually lead to middle- and top-management positions. Although some employers prefer persons with specialized training, such as engineering, chemistry, or accounting, for certain types of entry positions, they are often less concerned with the student's major field of study than with his interests, initiative, judgment, maturity, and other personal characteristics. Leadership qualities, as evidenced by holding a class office, participating in sports, or taking part in other extracurricular activities, are sometimes given great weight. School grades are usually considered less important for business-trainee positions than for technical-type jobs. The young person who has worked part time while attending school or during summer vacations is often given preference.

A college degree with a major in the field of business administration is considered excellent preparation for prospective managers. Many employers hire persons with this educational background because it can be utilized in a wide variety of business functions. Students in schools of business may specialize in one subject field or they may take a few courses in several fields such as accounting, economics, finance, marketing, salesmanship, advertising, and insurance, as well as business management. Some universities have special schools which stress training for managerial and other types of work in certain industries, such as retail trade or hotels and restaurants. Students in these schools acquire valuable experience since they are usually required to work part time in the industry they are preparing to enter. There is also a growing trend in colleges of business administration to broaden students' background by requiring more courses in subjects such as philosophy, history, English, psychology, and sociology. An increasing number of graduates who have majored in engineering or other technical fields take graduate work in business administration and thereby improve their chances of being selected for choice management jobs.

Business administration is the largest major area of specialization selected by male college graduates; it is second only to teaching in terms of all bachelor's degrees granted to both men and women. In 1958, the 51,250 business and commerce graduates accounted for about 1 out of every 7 college graduates. Nearly one-fifth of the business and commerce graduates majored in accounting--a subject field regarded as



Trainees receive on-the-job instruction from experienced management personnel

highly desirable preparation for many administrative positions, particularly those dealing with finance.

Although an increasing number of employers believe that a college degree offers some assurance that an individual has the basic ability necessary for advancement to management positions, it is still possible for outstanding individuals with less education to compete successfully for these jobs. Most companies offer some type of management training through which ambitious workers can improve their chances of promotion. Leaders in the field of management training emphasize that the informal training which individuals receive in their daily work is of vital importance in preparing for managerial jobs. Prospective managers learn a great deal by working under competent managers who try to instill good work habits in young people, encourage them to improve themselves, and give increasingly difficult assignments to promising individuals. Through experience, these employees gradually gain the required know-how concerning company policy, operations, procedures, customer relations, and other matters.

Various types of formal training programs for management trainees have been set up by companies. The most well-defined and usually the lengthiest programs are available in the larger companies. In these programs—some lasting as long as 3 years—individuals may receive formal classroom instruc-

tion in combination with rotation among jobs in the particular function where they may work. The instruction received is designed to give trainees an overall view of the manager's job and an understanding of how the work of the different sections in a department fits together to produce results. In training for marketing, for example, trainees may first attend lectures in order to become acquainted with overall company policies, procedures, and operations. They are then given on-the-job assignments in specific areas such as market research, product planning, sales, or advertising. Experienced managers supervise and rate the trainees, and make suggestions for improving the quality of their work.

Training for experienced managers is available from many different sources—within companies, at colleges and universities, and in special courses sponsored by various organizations. Executives of many companies participate in the training program of the American Management Association (AMA)--the largest professional management organization. The AMA conducts a continuing educational program for managers at all levels, ranging from lecture and workshop-type meetings lasting a few days to formal classroom courses lasting several weeks. These educational activities are usually led by experienced businessmen. The Society for the Advancement of Management (SAM) also sponsors educational-type meetings to help train managers. Membership in this Society is open to experienced managers in regular chapters. The Society also has chapters for students on college and university campuses. The American Institute of Management (AIM) is an organization which sponsors programs primarily of interest to experienced management personnel. Other professional organizations and trade associations distribute literature and sponsor meetings, conferences, and specialized training activities for managerial personnel, in a variety of industries and occupational fields. Active participation in such programs is valuable to managers not only because of knowledge that may be gained but also because of the contacts that may be made with businessmen in other companies.

Promotion to higher level management positions depends not only on the educational preparation and demonstrated ability of the individual, but also on his personal characteristics. Since an important aspect of the management function is getting work done through the efforts of others, the successful administrator must have outstanding leadership qualities and be able to get along well with people. Sometimes special personality tests are given the employees being considered for promotion, and several supervisors or managers may interview the candidates.

The rate of promotion in management positions depends also on the number of openings which may arise within a company as a result of expansion and turnover among experienced management personnel. Frequently, young people in large companies receive their first promotion within a year or two after completing management training programs. However, it usually takes several years to advance to a middle-management position involving considerable responsibility. The best opportunities for promotion are generally in companies that have a number of plants or branches in different areas, and in those that are expanding rapidly.

Employees may be promoted in one function, such as in a series of increasingly responsible accounting jobs, or, if they show special aptitudes, they may be transferred and advanced among different functions--personnel work, marketing, and public relations, for example. A typical line of promotion in a big company is from a supervisory job in a section to assistant department manager, department head, assistant division director or manager, and division director or manager, with the possibility of further promotion to vice president and, for some outstanding individual, to company president. Able managers with broad contacts may shift to better jobs in other firms, in the same or other industries.

Growth in Employment of Management Workers

In the past 20 years, employment of managers and related workers in private industry has more than doubled. This increase--from fewer than 1½ million workers in 1940 to about 3 million in mid-1959—represents a rate of growth about twice that of total nonfarm employment. In the past 5 years (1954-59), managerial employment has increased by about 25 percent, a rate 3 times greater than for total nonfarm employment.

The rapid increase in the employment of managers and other salaried administrative personnel is largely the result of the enormous expansion in the size of business firms. The growth of companies and the establishment of many branches have reflected the demands of a rapidly increasing urban population for more products and services. As business enterprises become larger and establish more plants, they tend to employ higher proportions of management personnel. In 1940, slightly less than 4 percent of all nonfarm workers were in management positions; in 1959, approximately 5 percent were in this type of work.

In general, the larger and more complex a company becomes, the more specialized are its management functions. For example, a large firm needs specialists to control its fiscal department, direct personnel and industrial relations activities, guide research programs, plan and develop additional branches, locate new markets, organize advertising and other publicity projects, and give legal counsel, as well as to manage the various departments concerned more directly with production and distribution.

The growth in managerial occupations has been accompanied by an increase in the number of women entering this type of work. During the 1940's, employment of women in management positions grew at a rate twice that for men. Even so, in 1950, women constituted only about 13 percent of all salaried managers. Major factors contributing to the increase in the employment of women managers were rising levels of economic activity, the greater participation of women in all types of employment, and the shortage of male workers during the World War II period. The largest area of employment for women managers is in retail trade which, in 1950, provided jobs for more than 100,000 female managerial workers, or over 40 percent of all women managers. Many of the women in retail trade were employed as buyers and department heads; between 1940 and 1950, the numbers in such positions more than doubled.

Employment Outlook

Employment opportunities are expected to be very good during the early 1960's for young people to enter and advance in management careers. Many openings will arise in new and rapidly expanding functions and industries. There will also be numerous opportunities for management trainees in established areas of business activity. Among the major factors underlying this favorable outlook are the anticipated rise in population, economic growth, and continuing increase in the size of companies; emergence of new products, markets, and even new industries; and the ever-increasing complexity and specialization of managerial functions. Businessmen, keenly aware that successful competition depends largely on the competence of management staffs, are expected to hire and train many thousands of young people each year and promote them to managerial positions.

If the recent high rate of employment growth of salaried managers in private industry continues, more than 100,000 managers will be employed in new jobs each year, on the average, during the early part of the 1960 decade. Moreover, additional thousands will be needed annually to fill vacancies arising from turnover. Such vacancies occur mainly among young management workers who are not suited for this type of work, and among older managers who retire or die. The average age of managers is higher than for any other sal-

aried occupational group. It is estimated that between 50,000 and 75,000 managers will be required annually for the next several years just to replace those who die or retire. The vacancies will provide advancement mainly for experienced managers. Nevertheless, for every manager promoted, a vacancy is usually created farther down the managerial ladder.

The most rapid advancement and the best managerial jobs will, in most cases, go to college graduates who have the necessary personal qualifications, including evidence of leadership, drive, imagination, integrity, and skill in human relations. Graduates of schools of business administration are expected to continue to be in strong demand for managerial jobs, particularly in such areas as finance, marketing, and purchasing. However, graduates with degrees in the liberal arts, law, and many other subject fields will also continue to find opportunities in a number of management-type jobs.

Demand is expected to be above average for college graduates with majors in scientific and engineering fields who also have the qualities necessary for good administrators. An important factor in the employment outlook for this group is the likely continuation of a high level of expenditures for research and development work.

A growing number of women are expected to enter management occupations in private industry. However, their employment in this area of work is likely to remain limited owing to the fact that many women do not stay in the labor market long enough to make a career in management. A recent study by the Women's Bureau in the U. S. Department of Labor indicated that only 18 percent of women college graduates in 1957 were planning on a career; the vast majority planned to stop work when they had children or to work only for a short while after marriage. Business firms are reluctant to train either men or women for management positions unless they plan to stay with the company.

Over the long run, a marked expansion in business activity and total nonagricultural employment is expected in the United States. An increase in the number of management positions will undoubtedly accompany this general increase in employment. The same factors which have contributed to the recent high rate of growth in the management field are expected to continue to operate, assuming a high level of economic activity. Even in times of recession, employees responsible for the management functions in a company have relatively stable employment.

Earnings and Working Conditions

Starting salaries averaged nearly $5,000 a year for business trainees hired by large companies in mid-1959, according to reports from college placement officials. Most beginning salaries were within the range of $4,500 to $5,500 in large firms. Men with advanced degrees in business administration—especially those who also had bachelor's degrees in engineering, mathematics, or science—generally received premium starting salaries.

A private survey indicated that an average annual salary of about $7,600 was earned in 1958 by graduates in business administration who had started in beginning jobs 5 years earlier. According to limited reports, persons with considerable experience who were employed in such jobs as production manager, plant manager, district sales manager, tax department manager, public relations manager, or manager in charge of electronic data-processing earned salaries of about $10,000 in small companies up to about $25,000 in large companies in 1958. Salaries of managers in a few large companies were between $30,000 and $40,000 annually. Within each company there may be a difference of several thousand dollars between the lower and upper limits of pay for a particular type of management position; pay raises within this range generally depend on how well an individual performs his job.

Earnings of top executives depend largely on company size and sales vol-

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ume. The highest paid executive--usually the company president--may receive total compensation (including salary and bonus) of $50,000 to $75,000 a year in companies with an annual sales volume between $50 and $75 million, and from $100,000 to $150,000 in firms with annual sales between $300 and $500 million. Only a few top executives in giant industrial corporations earned more than $300,000 (before taxes) in 1958. Top executives having overall charge of functions such as marketing, sales, or engineering generally receive compensation amounting to from one-third to one-half that of the company president. Usually, the highest paid of these executives are in charge of sales, finance, and manufacturing, in that order. Earnings of top sales executives averaged nearly $62,000 in 1958, according to a private study. Compensation levels of high-ranking management officials, especially the amounts paid as bonuses, are greatly affected by a company's profits; bonuses normally average about 45 percent of salary.

Management trainees usually work the standard workweek of the company--generally from 35 to 40 hours a week. When assigned to more responsible jobs, they often work extra hours to handle nonroutine assignments. They may make special reports, attend special meetings, deal with customers, or travel for the company on their own time. Trainees receive paid holidays and generally are given 2 weeks' annual vacation with pay. Related benefits generally include life insurance, hospitalization and surgical insurance, and pensions. Many companies pay tuition and other fees for managers who enroll in specialized education and training programs. A number of companies also provide free recreational facilities to company officials.

Company executives are usually reimbursed for expenses arising in the conduct of business matters, for example, amounts spent for hotel bills, transportation on business trips, customer entertainment, and secretarial services. Employers often provide a company car or pay taxi fares for local trips and may even provide a company plane for travel about the country. The working arrangements of managers and executives usually reflect the prestige of their position. For example, a beginning management worker may share an office with other management workers and have letters and reports typed in a central stenographic pool. On the other hand, a higher level manager or executive may have his own well-furnished office, a private secretary, a receptionist, and other office assistants.

Men and women in important company positions frequently add to their own prestige and to that of their companies by becoming active in community organizations, trade associations, professional societies, and other organizations. They may give speeches, help on special projects such as fund-raising campaigns, write articles for the organization's magazine, or be active in other ways. As a result of the broad contacts made in such activities, executives sometimes receive job offers which may advance their careers.

GROWING OPPORTUNITIES IN THE SKILLED TRADES

by Sol Swerdloff
and
Howard Rosen

Since the successful launching of Russia's first sputnik, the American people have shown a growing concern over the adequacy of our supply of scientists and engineers. This concern has led to a reappraisal of our entire educational system. A great deal of attention has been directed to the need for training more scientists and engineers. However, we should not permit the current emphasis on technical manpower to lead us into the error of neglecting another group of key workers in our economy--the skilled craftsmen. The Nation's economic and military strength depends, to a great extent, on the initiative, competence, and skill of its craftsmen. The contributions of physicists, engineers, chemists, and other professional workers cannot be transformed into consumer goods and into guided missiles and atomic reactors without an adequate supply of well-trained skilled workers.

How great are our requirements for skilled craftsmen? A study of future occupational requirements and replacement needs made by the U. S. Department of Labor's Bureau of Labor Statistics indicates that despite the phenomenal growth expected for engineers, three times as many building craftsmen as engineers will have to be trained during the 1960's to satisfy the anticipated expansion of our economy. Similarly, for each chemist we train, we shall need to train three automobile mechanics.

Advantages Offered by the Skilled Crafts

The skilled trades offer some definite advantages for young persons without a college education—and only one out of three attended college in 1958. Skilled workers have higher earnings, more job security, better chances for promotion, greater mobility, and more opportunities to open their own businesses than most of the other groups in our labor force.

Of the 11 broad occupational groups which make up the labor force, only professional and managerial workers had higher average annual earnings than craftsmen, in 1958.

The fact that craftsmen have greater job security than less skilled workers was clearly demonstrated in the 1957-58 recession. Their rate of unemployment was only about half the rate for semiskilled and unskilled workers. American employers were reluctant to lay off skilled maintenance workers, tool and die makers, electronic specialists and other craftsmen with special skills.

A wide choice of jobs is open to a worker with thorough training and experience in a craft. He may shift to other jobs within an industry, as well as to jobs in other industries. Such a worker is able to handle not only a skilled job, but also, if it becomes necessary, one requiring a lesser skill.

Opportunities for New Workers

Young persons interested in becoming skilled craftsmen will want to know which fields will provide the better opportunities. The 1959 Occupational Outlook Handbook predicts that the fastest growing skilled occupational group will be that of mechanics and repairmen. As mechanical equipment becomes more complex and more widely used, there will be a growing demand for industrial machinery repairmen, maintenance electricians, and automobile and deisel mechanics. In the building trades, substantial numbers of job opportunities for skilled workers are expected to develop from the an-

An apprentice gets some pointers from experienced tool and die maker on the construction of dies

ticipated sharp rise in construction activity in the next decade. The major skilled machining occupations--those of tool and die maker and machinist--should also provide a large number of job openings in the years ahead. The skilled printing trades will provide another large area of employment opportunities. Some of the new employment fields such as atomic energy and guided-missile production will also require increasing numbers of skilled workers.

Meeting the Needs for Skilled Workers

One of the major obstacles to achieving an adequate supply of skilled workers is the fact that a large segment of the population seems to have a prejudice against "blue-collar" work. Many parents feel that any white-collar job is more desirable, and carries more prestige, than a skilled blue-collar job. These same parents may urge their children to become white-collar workers, without considering the youngsters' capabilities and inclinations. Many intelligent young persons with mechanical aptitude who liked to work with their hands as well as their brains, and who were not interested in going to college, have been mistakenly directed toward white-collar jobs. Undoubtedly, many of these young persons would have attained more job satisfaction and higher incomes if they had entered the skilled trades.

This prejudice against blue-collar jobs may be partially lessened if vocational counselors will explain to young people and their parents the advantages of becoming a skilled worker. Above all, it is important to make the point that an investment in training--through apprenticeship and vocational schooling--will pay off in higher lifetime earnings, more job security, and many other advantages. Too many young persons who enter the labor force make the mistake of taking blind-alley jobs simply because of the high initial pay.

Because the Department of Labor recognizes the importance of the skilled trades, not only as a vital necessity to our economy, but also as an excellent source of rewarding lifetime careers, it conducts a continuing program to promote the growth of the skilled work force and aid in vocational guidance of young workers. Through its Occupational Outlook Handbook and other publications, it provides needed occupational information. The Bureau of Apprenticeship and Training promotes training programs for skilled workers in industry and the Bureau of Employment Security, through associated State employment services, provides testing, counseling, and placement services for young persons.

It is also important that schools offer sound basic training in mathematics, the sciences, and communications for young persons who will be our future skilled workers, as well as the vocational education which will provide a grounding in fundamental skills. Industry and labor can contribute also by providing more opportunities for training in skilled occupations through apprenticeship and other training programs.

Skilled craftsmen have always been important contributors to America's great economic development. In the past, many of our skilled craftsmen were European trained. Today, only a small number of foreign-trained craftsmen enter our labor force. Obviously, the development of an adequate supply of skilled workers depends upon all of us--parents, counselors, teachers, employers, and government officials.

THE GOLDEN ANNIVERSARY WHITE HOUSE CONFERENCE

The Golden Anniversary White House Conference on Children and Youth will be held in Washington, D.C., during the week of March 27-April 2, 1960. The purpose of this conference is "to promote opportunities for children and youth to realize their full potential for a creative life in freedom and dignity."

To facilitate the planning of the conference program, the various State committees on children and youth were asked to indicate their major areas of concern. It is interesting to note that "vocational guidance service" was listed by 23 States as one of their major areas of concern; it ranked 6th in frequency of mention among the subjects reported by the 45 States responding. This is indicative of a growing awareness of the importance of vocational guidance among persons concerned with the whole range of emotional, physical, and social problems facing American youth. The only areas of concern mentioned more frequently were juvenile delinquency, emotionally disturbed children, retarded children, the religious and spiritual life of children, and establishing values and ideals in children.

Our youth and the problems affecting them will be studied and discussed at the conference by representatives of 500 national organizations and 55 Governor-appointed State and territorial committees, together with various Government officials and foreign visitors. Physicians, lawyers, educators, social workers, and representatives of many other fields will sit down with laymen to investigate the needs of youth and to develop a series of recommendations that will aid in expanding the creative potential of youth while meeting their special problems.

Planning is already under way to insure the practical application of the lessons learned and recommendations made. Each White House Conference, therefore, is not just a 5- or 6-day series of meetings, but a decade-long process extending from the preparation for the current conference to the next decennial conference.

The White House Conference tradition, which commenced in 1909 under President Theodore Roosevelt, and which has been continued every decade since, has produced the Children's Bureau, Federal and State child-labor laws, and has influenced virtually every other forward development expressing this country's concern for its children and youth. The Golden Anniversary White House Conference on Children and Youth will be continuing a tradition of significant contribution in an area of major national concern.

EMPLOYMENT OUTLOOK FOR ASTRONOMERS

by Howard V. Stambler

Astronomy, often considered the most theoretical and least practical of all sciences, is in reality a science which serves us every day in a variety of ways. Astronomical observations of the sun, moon, planets, and stars are the basis for sea and air navigation, the calendar, and the accurate measurement of time. Astronomy provides both a proving ground for our theories of time and space, and a laboratory where we may observe matter and energy under the most extreme conditions of temperature and density. Astronomy also helps fill in the gaps in our knowledge of the physical world. For example, astronomers who have studied the behavior of atoms under stellar temperatures have made valuable contributions to thermonuclear research and to our knowledge of the atom.

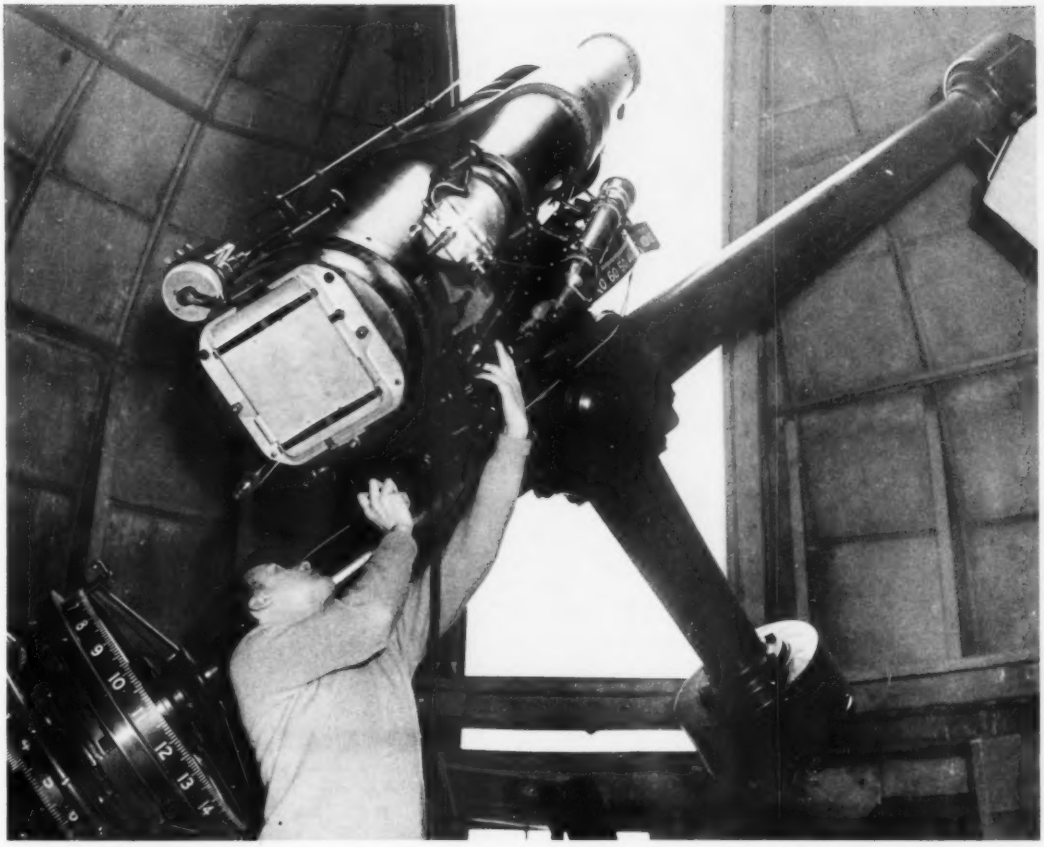
For the prospective scientist, astronomy offers virtually unlimited opportunities for further research and investigation into some of the most fundamental and intriguing problems of all science--the size of the universe, the evolution of stars, the origin of life on earth, and the possibility of life on other planets. Astronomy, which has fascinated the mind of man through the centuries, will continue to offer new problems to solve and new facts to be uncovered.

Nature of Work

The universe and all its celestial bodies are subjects of the astronomer's study. Astronomers collect and analyze data on the sun, moon, planets, and stars, and attempt to determine their sizes, shapes, brightness, and motions. They compute the positions of the stars and planets, calculate the orbits of comets and asteroids, and make statistical studies of stars and galaxies. They also study the size and shape of the earth and the density of its upper atmosphere.

In making their detailed observations of the heavens, astronomers use complex photographic techniques, light-measuring instruments, and optical devices. The reflecting telescope is the major instrument used for observation, and specialized devices are often attached to the telescope for making particular types of observations. Among these devices are the spectrometer, which measures the wave lengths of radiant energy (by means of its spectrum); the photometer, which measures the intensity of light; and various other photoelectric, photographic, and electronic instruments and devices. Although most observations are made by means of telescopes permanently mounted in observatories, astronomers sometimes gather information by sending aloft balloons, rockets, and space vehicles containing various measuring devices. In processing and analyzing the data derived from their observations, astronomers often utilize high-speed electronic computers.

Astronomers usually specialize in some one of the many branches of the science. In astrophysics, they apply the techniques and concepts of physics to astronomical problems, principally in an attempt to determine the temperature, luminosity, and chemical composition of heavenly bodies. Some astronomers work in the field of celestial mechanics, one of the earliest fields of astronomy and one that has recently acquired new importance. Celestial mechanics deals with the motions of objects in the solar system, and hence has a particular application in the calculation of the orbits of artificial earth satellites and the paths of guided missiles. Radio astronomy is the study, by means of radio telescopes of extraordinary sensitivity, of the source



An astronomer adjusts a telescope for photographing the heavens

and nature of celestial radio waves. Other specialties are astrometry (measurements of positions of celestial bodies); physics of the sun, planets, and satellites; photoelectric and photographic photometry (measurement of the intensity of light); spectroscopy of astronomical sources (analysis of the wave lengths of radiation from celestial bodies); star systems; and statistical astronomy (statistical theory of the motions of celestial bodies).

Teaching and research are the major activities of astronomers. About three out of every four astronomers are engaged in teaching, research, or some combination of the two. In colleges and universities without separate departments of astronomy or with small enrollments in the subject, the teaching schedule may include courses in mathematics or physics as well as astronomy. Most of the other astronomers are engaged in management, development and design, and various technical activities, such as writing. A few do consulting work.

Where Employed

Astronomy is one of the smallest of the science fields; the total number of astronomers in the United States was estimated to be only about 500 in 1958. More than one-half of all astronomers are employed by colleges, universities, and other educational institutions. Many

astronomers work for observatories, some of which are operated by colleges and universities and others by nonprofit research institutions. Astronomers employed in observatories usually devote most of their time to research, working by themselves or in cooperation with other astronomers. Because of the opportunity it offers to carry on research, a professional position in a large observatory is considered by many to be the most desirable position in astronomy.

The Federal Government provides employment opportunities for a number of astronomers. Among the major Government agencies employing astronomers are the National Aeronautics and Space Agency, which is responsible for planning and conducting all nonmilitary aspects of the U. S. space program; the U. S. Naval Observatory, which determines the Nation's official time and provides data for air and sea navigation; the Naval Research Laboratory, which does research in radio astronomy; and the Army Map Service, which utilizes astronomers in measuring exact distances and in determining the positions of points on the earth's surface. Government positions in astronomy may also be found at the Air Force Cambridge Research Center (Bedford, Mass.), the Smithsonian Astrophysical Observatory, the U. S. Coast and Geodetic Survey, and other agencies.

A very small but growing number of astronomers are employed in private industry, mostly by firms in the aircraft and missile industry. A few astronomers work for museums, planetaria, and other organizations.

Training and Other Qualifications

A Ph. D. degree in astronomy is extremely important for persons who hope to attain high-level professional positions in astronomy. Colleges and universities usually appoint only astronomers who have received the doctorate or who are working towards it, and observatories are equally strict in their hiring requirements. Although some beginning astronomer positions in the Federal Government and private industry do not require the doctorate, opportunities for advancement for those with a Ph. D. degree are more favorable.

New graduates with bachelor's or master's degrees in astronomy usually obtain employment mainly in semiprofessional or starting positions in observatories, planetaria, large departments of astronomy in colleges and universities, Government agencies, or industry. Among these workers are research assistants, computers, photographers, optical workers, observers, and technical assistants. The position of research assistant is a particularly desirable one for astronomical workers who do not have the Ph. D. degree. An appointment as research assistant in an observatory or university provides opportunity for active participation in astronomical research programs and close association with top rank professional astronomers. Some persons with only the bachelor's degree take these research assistant positions while working toward advanced degrees.

An astronomer operates the controls of an 84-foot steerable radio telescope used in the study of celestial radio waves

Young people seeking careers as astonomers need not wait until they go to college to start their preparation. They should begin while still in high school by taking all of the mathematics and science offered. Courses in physics, chemistry, and a foreign language are particularly valuable.

Upon graduation from high school, the prospective astronomer should, if possible, attend a college or university which offers the bachelor's degree in astronomy. The undergraduate work for a major in astronomy includes a great many courses in physics and mathematics, in addition to courses in astronomy. A reading knowledge of at least one foreign language (German, French, or Russian) is essential, and training in chemistry, statistics, and electronics is useful. A few of the courses usually taken by undergraduates in the field of astronomy are optics, spectroscopy, atomic physics, calculus, differential equations, solar and stellar systems, introductory astrophysics, and astronomical techniques and instruments.

Bachelor's degrees in astronomy are offered by a relatively small number of schools. In 1958, only about 30 colleges and universities offered such a degree. A prospective astronomer is not necessarily handicapped if he is unable to obtain such a degree, however, since the undergraduate work required for a degree in astronomy is similar to that required for a degree in physics or mathematics. Consequently, the student with a degree in physics or mathematics and with some courses in astronomy should encounter little difficulty in pursuing graduate work leading to the Ph. D. in astronomy. Conversely, students with bachelor's degrees in astronomy can usually obtain positions in the fields of physics and mathematics, if they so desire.

Training leading to the doctorate in astronomy may be obtained in about 20 institutions, located in various sections of the country. The academic work of the graduate student seeking the Ph. D. degree in astronomy consists primarily of advanced courses in astronomy, physics, and mathematics. A few of the astronomy courses typically offered in graduate school are celestial mechanics, galactic structure, radio astronomy, stellar atmospheres and interiors, theoretical astrophysics, and variable stars. In most institutions, the program of work leading to the doctorate is flexible and allows the student to take the courses which will be of most value to him in his astronomical specialty or particular area of interest.

In addition to completing the formal course requirements for the Ph. D., the student is required to show a reading knowledge of two foreign languages (German, French, or Russian), pass a preliminary examination on his general astronomical and scientific background, write a dissertation on an original research project, and pass a final examination (oral or written) in which he defends his thesis. Furthermore, some institutions require that graduate students spend several months in residence at an observatory.

New astronomy graduates employed by educational institutions normally begin as instructors. Advancement is usually from instructor, through assistant and associate professor, to full professor, and, on occasions, to department head or other top position. Astronomers sometimes move from a small college to a large university, or from a position in which most of their time is spent teaching to one which offers more opportunity for research.

Entry into Federal Government positions is on the basis of competitive examinations. Such examinations are given continuously by the Board of U. S. Civil Service Examiners for Scientific and Technical Personnel of the Potomac River Naval Command, Washington 25, D. C. Advancement in Government service depends upon the individual astronomer's ability, education, and experience.

The student planning a career in astronomy should consider not only whether he has the financial means and the perseverance necessary for the 7 or more years of college study, but also whether he has the necessary per-

sonal qualifications. The personal qualifications desirable in an astronomer are very much the same as those which nearly every scientist needs for success --among them a deep curiosity about the nature of the physical world, precise and logical thought processes, a strong interest and facility in mathematics and physics, and a fertile imagination. Astronomers should also be able to express themselves clearly and simply, both in writing and speaking, since their work often requires them to communicate not only with other astronomers and scientists, but with the public as well. Perhaps the most striking and singular personal characteristic possessed by most successful astronomers is a deep and abiding love for their field of science. A young man without this feeling of dedication may find that the rewards of astronomy, both financial and psychological, are not enough payment for the years of intensive preparation required.

Employment Outlook

Employment opportunities for astronomers with the Ph. D. degree are expected to be excellent during the early 1960's. Well-trained persons with only bachelor's or master's degrees in astronomy will also have good employment prospects, primarily as research and technical assistants. As in the past, however, the higher level professional positions in astronomy will be filled mainly by persons with doctorate degrees.

The outlook is for rapid growth of this small profession, both in the early 1960's and over the long run. America's entry into the space age--the age of rockets, guided missiles, manmade earth satellites, and space travel--has heightened interest in astronomy and is opening up large new fields for astronomers. These scientists will be needed to aid in the development of guidance systems and other instrumentation for missiles and satellites, and to help solve many of the problems connected with the flights of missiles, space vehicles, and artificial earth satellites.

Increased research activities in astronomy by educational institutions, government, and industry are also expected to add to the demand for astronomers. In recent years, the growth of Federal Government sponsored research, in the form of grants to educational institutions and observatories (for astronomical research and for new buildings and equipment), has opened many new positions for astronomers. In all probability, government expenditures for research will continue to grow. Additional astronomers will also be needed by industry to conduct further research on manned satellites and space stations, as well as on problems involved in charting rocket courses to the moon and nearby planets.

The growing public interest in satellites and space exploration has created a demand for a greater amount of popular information on astronomy. Furthermore, enrollments in astronomy courses in colleges and universities are likely to increase, not only as a result of this heightened public interest but also due to the growing awareness of the value of astronomical training in many other scientific and engineering specialties. These factors, coupled with the anticipated increases in college enrollments, are expected to create many new openings for teachers of the science.

Since astronomy is a small profession, the number of job openings in any one year will not be large. On the other hand, the number of college students taking the rigorous and lengthy programs in astronomy has so far been small. In 1958, for example, only 67 degrees in astronomy were granted--25 bachelor's, 20 master's, and 22 doctor's. Even if the proportion of all college students majoring in astronomy increases markedly during the next decade, the number of new professional astronomers available for employment in astronomy in any one year will be extremely limited. Thus, the young men or women who obtain the necessary training should have excellent employment opportunities during the 1960's.

Job prospects for graduates in astronomy without the Ph. D. are also

expected to be favorable during the next decade, particularly for work as research assistants in astronomy departments or laboratories. Research assistants are being utilized more and more in research programs, under the direction of the professional staff. Numerous other openings for these graduates are expected to arise during the next decade for employment as computers, opticians, instrument makers, and photographic and electronics experts. These assistants and technicians are not usually regarded as professional astronomers, however, and without the Ph. D. degree their chances of promotion may be limited. Still other openings for astronomy graduates should arise in such allied fields as technical writing, scientific news reporting, and secondary teaching.

For women astronomers, particularly those with the Ph. D., the most favorable opportunities will be in teaching and research positions in women's colleges and in the larger coeducational institutions. Government agencies should also offer some employment opportunities for women astronomers. In addition, some openings for research assistants or computers in observatories or universities will probably arise for women with bachelor's or master's degrees in astronomy.

Earnings and Working Conditions

Astronomy, like many other scientific fields, offers its scientists a comfortable, if not luxurious, living. According to preliminary information from the National Science Foundation's 1956-58 National Register of Scientific and Technical Personnel, the median (average) annual earnings of astronomers was nearly $7,300. About 20 percent earned more than $10,000 a year, and nearly 9 percent earned $12,000 or more. More recent information on astronomers' earnings is not available. However, as salaries paid scientists have, in general, been rising in the past few years, the average earnings of astronomers in 1959 were probably higher than the figures that are shown here.

Astronomers in educational institutions receive roughly the same salary and have the same prerogatives and responsibilities as other faculty members. In the 1957-58 academic year, the median salary for college instructors in all fields was about $4,600 for 9 months of full-time teaching. Salaries of assistant professors averaged about $5,600 and associate professors about $6,600. Full professors had average earnings of about $8,100 in 1957-58. Generally, large institutions pay more than small colleges, and state universities, technological institutes, and large privately controlled universities generally pay more than community colleges, small liberal arts colleges, and women's colleges.

Astronomers in educational institutions often earn some professional income in addition to their regular salaries. Consulting work is one source of extra income for astronomers, as is summer school or other teaching not a part of their regular duties. A few astronomers in colleges and universities derive some income from lectures and from books and articles.

In the Federal service in mid-1959, beginning astronomers with the Ph. D. degree were eligible to enter at $7,510 a year. Astronomers with the bachelor's degree could start at $4,490 or $5,430 a year, depending on their college record, and those with the master's degree, at $5,430. Some astronomers in high-level positions earned more than $10,000 a year, and a few earned as much as $13,000 a year. As in educational institutions, the Ph. D. degree is usually required for promotion to the higher level and better paying professional positions.

Some astronomers spend considerable time in nightwork, making visual observations or setting up and adjusting the telescope for photographic and photoelectric work. Others make observations and photographs 4 or 5 nights each month and devote the remainder of the time to studying and analyzing the plates and other findings during usual daytime working hours. Astronomers' hours of work may range from a 40-hour week,

when they are studying and analyzing data and photographic plates, to considerably more than 40 hours when they are engrossed in a particularly interesting or perplexing problem. Observational work at a telescope involves exposure to the outside air through the open dome of the observatory, even on cold winter nights. In general, however, the physical requirements of astronomical work are not heavy and can be met by a reasonably healthy person.

EARLY EDUCATIONAL PLANNING ADVISED BY VETERANS ADMINISTRATION

Parents and guardians of young people who are eligible for benefits under the War Orphans Education program and who will be leaving high school within the next few years are advised by the Veterans Administration to make their post-high-school plans early. These young people, all between the ages of 13 and 18, are those whose parent died of a service-connected disability incurred or aggravated during World War I, World War II, or the Korean conflict.

VA letters recently mailed to parents and guardians noted that although the War Orphans Education program generally applies starting at age 18, the time to start thinking about post-high-school education is during the early years of high school. The VA emphasized the importance of planning the young persons' secondary school course so that it will provide an adequate foundation for a program of education which may be pursued later.

The letters added that "you (the parent or guardian) and the school counselor or principal will undoubtedly assist in planning this course." Parents and guardians were also invited to talk over their children's high school plans with Veterans Administration counselors, although formal Veterans Administration counseling will not begin until the boy or girl nears the end of high school.

The Veterans Administration sent out the letters to enable war orphans to make the most advantageous use of their educational benefits when the time comes. Similar advance notice will go to the parents and guardians of all potentially eligible youngsters when they reach their thirteenth birthday.

Under the War Orphans Education program, eligible young people may enroll in college or in vocational courses once they have graduated from high school or passed the age of compulsory school attendance. Veterans Administration pays an allowance of up to $110 a month for each month of a student's education, to a maximum of 36 months.

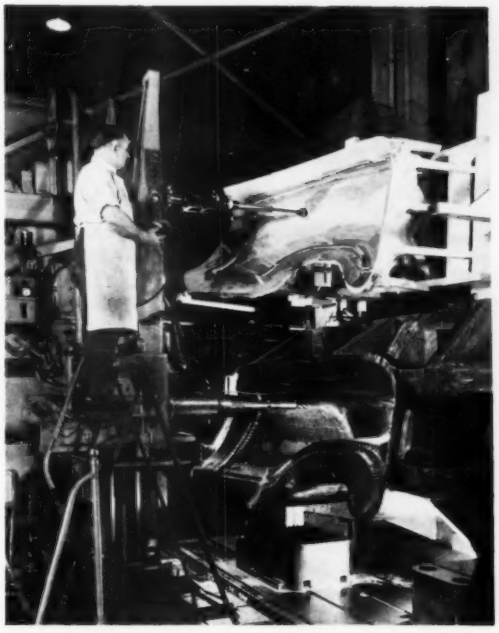
FUTURE NEEDS FOR MACHINING WORKERS IN NEW YORK STATE

by Abraham Berman and Harold Loeb*

Skilled craftsmen in the metalworking industries are one of the key groups of workers in the United States. These craftsmen--the toolmakers, mechanical instrument makers, machinists, and machine erectors--are an important factor in making the Nation's metalworking industries among the most efficient in the world.

Since the beginning of World War II, industries in New York, as in many other sections of the country, have been confronted with a scarcity of skilled craftsmen in the metal trades, despite the efforts of the State and Federal Governments, and of industry itself, to enlarge the supply through training and other means.

In March 1957, the New York State Department of Labor conducted a survey to determine the need for skilled metal-trades craftsmen. Employers questioned in connection with this survey indicated they were actively seeking 4,800 additional craftsmen--1 for every 17 already on the payroll. Tool and die makers were in greatest demand--1 being sought for every 10 employed. In addition, employers were seeking 6 percent more all-round and maintenance machinists; 5 percent more first-class machine hands; and 3 percent more bench machinists, machine erectors, and mechanical instrument makers. Among first-class machine hands (skilled operators who are able to set up their machines, read blueprints, and work to very close tolerances), demand was greatest (7 percent) for lathe hands. The largest number of craftsmen was being sought by smaller plants in the metal and machinery industries--those employing 50 or fewer workers. These plants accounted for 60 percent of the job vacancies, although they employed only 20 percent of the craftsmen.



A machinist cuts a die for a left front fender

The survey also provided detailed information on existing training programs in these fields and anticipated needs for from 5 to 10 years in the future. These findings apply, of course, only to New York State, but the broad conclusions are suggestive of what is happening in the metalworking industry as a whole.

Employment

The metalworking occupations covered by the survey employed 82,000

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skilled craftsmen, of whom about 86 percent were in the metals and machining industries. Of these, about 24,000 were all-round maintenance machinists; 15,000 were tool and die makers; 12,000 were bench machinists, machine erectors, and mechanical instrument makers; and 31,000 were first-class metalworking machine hands.

Substantial numbers of the skilled metal trades craftsmen were in small plants. Nearly 30 percent were in plants with fewer than 100 workers, and 13 percent, in plants with fewer than 20. On the other hand, 46 percent were employed in plants having 1,000 or more workers.

Metalworking craftsmen were older, on the average, than other workers: the median age of machinists and tool and die makers in March 1957 was 43 years, and of first-class machine hands, 41 years, compared with a median age of 40 for all workers in New York State. Four percent of all machinists and toolmakers and 2 percent of all first-class machine hands were over 65 years of age.

In March 1957, craftsmen in the metal trades in manufacturing were working longer hours than the other production workers in the same plants--43.0 and 40.4 hours, respectively, which means that if the craftsmen had worked the same hours as the other production workers in the same plants, their employers would have had 6 percent fewer craftsmen man-hours available.

The longest average workweek was found among tool and die makers--43.5 hours, or 2.4 hours more than all production workers in the firms that employed these craftsmen. In tool and die shops, toolmakers averaged almost 46 hours a week; in machine shops they averaged over 45.

Craftsmen in small- and medium-size plants averaged longer workweeks than did those in large plants. Among metals and machinery plants, those in the 20- to 49-employee group reported the longest weekly hours--44.6. The shortest average hours were reported by plants in the largest size group (5,000 or more workers), where craftsmen averaged 41.6 hours a week. Especially long hours--50 or more a week--were reported mostly by small plants.

Future Needs for Craftsmen

Preliminary estimates of the New York State Department of Labor in March 1957 indicate that about 23,000 additional craftsmen will be needed in the 8-year period from 1957 to 1965. This is an average of 2,900 every year, or 3.5 percent of the total number employed in March 1957. About 13,000 (57 percent) of the 23,000 will be required to replace those who die or retire; the remainder will be required to meet the expansion needs of New York industry. These estimates are conservative, as they do not include the 4,800 craftsmen that New York State employers were reported seeking at the time of the survey. In addition, new craftsmen are needed to replace those who leave their occupations to enter other types of work. A good many of the latter are promoted to jobs that require proficiency in their craft skills. The study indicated that 12,000 foremen, technicians, and tool designers in New York State had craftsman skill--approximately 15 percent of the number of working craftsmen.

Meeting Future Needs Through Training

Only a minority of plants conduct training programs. About 1,150, or 17 percent of the approximately 6,700 plants employing craftsmen in metal trades covered by the survey, were engaged in training in March 1957. These plants, employing 42,000 of the 82,000 skilled metal-trades craftsmen, had 5,600 trainees.

Among trainees in all of the occupations covered by the survey, the largest proportion (40 percent) were under informal training programs--those that do not define the training period. Approximately 34 percent were under formal programs that were not registered with the New York State Apprenticeship Council, and the remainder were receiving

their training under registered programs.

At present rates, all of these programs together can be expected to train only 30 to 40 percent of the additional craftsmen required during the period 1957-65. Unless all these programs are extended substantially, New York industry will be forced to rely primarily on the relatively uncertain processes by which workers absorb skills on the job to meet its needs for the future.

Compared with small- and medium-size plants, training programs are relatively common in large establishments. Nevertheless, there is still room for training in large establishments that do not now have such programs. Among metals and machinery manufacturers employing 2,000 or more workers, nearly a third, employing a fifth of the craftsmen, had no training program in 1957. If one of these large plants undertook a training program, it probably would produce as many skilled people as similar programs in several smaller establishments.

However, any substantial increase in training would also require the cooperation of more medium-size and small establishments. The construction and printing trades of New York State have solved the training problem to some extent by setting up joint employer-union apprenticeship councils. But so far, this kind of group action has had very limited application in the metal trades.

There are a number of advantages in having such a council or association supervise the apprentice training program. An employer association, for instance, acting alone or working jointly with a union, can estimate future skilled manpower needs for the trade in an area more confidently than can the individual smaller firm, and it can also help a firm consider intelligently the value it can derive from a training program. Moreover, a joint council or an association might meet the small member's lack of training facilities and know-how by setting up courses to replace or supplement training by the firm. And even if it does not do this, an association can

Apprentice diemaker grinds down a surface on a die for a small part

assist in recruiting candidates for training, and develop ways of testing prospective trainees; develop course content; set standards; arrange for related instruction in educational institutions; arrange to shift a trainee temporarily from a plant that lacks training facilities to another plant where he can develop a fuller range of skills; arrange for the transfer of credits and maintenance of records of trainees moving from one establishment in the trade to another; and assist in solving problems that arise during training.

Improvements in training stemming from coordination of this sort would not, of course, necessarily overcome the difficulty experienced by some small plants in recruiting and holding competent learners in competition with large establishments that may offer better wages, more fringe benefits, attractive workplaces, and better chances for promotion. Moreover, a plant may hesitate to take on a learner, because its expansion needs are so small that they may be met by lengthening the working hours of the craftsmen already employed or of the proprietor himself, or by occasional recruitment in the labor market.

EARNINGS IN TYPICAL OFFICE AND PLANT JOBS IN 20 LABOR MARKETS, 1958-59

Pay levels of office and plant workers continued their upward trend in 1958-59, according to a recent survey by the Bureau of Labor Statistics. The survey, which covers earnings in key office and plant occupations in 20 large metropolitan areas, shows recent trends in pay rates, and the extent of differences among the rates in each occupation and in each of the areas covered.[1]

The occupations represented in the survey were selected because they appear in a wide variety of industries, provide employment to many workers, and represent a wide range of occupational fields. They include a few key occupations in each of the following groups: office and clerical; professional and technical; maintenance and powerplant; and custodial, warehousing, and shipping.

Earnings Trends

Pay levels in all the occupations studied continued upward in 1958-59. The median increase over the 1957-58 pay level was 3.5 percent for women officeworkers, 4.2 percent for women industrial nurses, 4.5 percent for skilled maintenance men, and 4.7 percent for unskilled men plant workers. These increases were slightly lower than the corresponding increases during the previous year.

Over the 6-year period from 1953 to 1959, median increases in earnings ranged from 29.3 percent for women officeworkers to 33.9 percent for industrial nurses. Earnings of skilled maintenance workers and unskilled plant workers increased 32.5 and 32.4 percent, respectively. Increases in earnings over the 6-year period also varied substantially among areas. Increases for women officeworkers, for example, ranged from 25.0 percent in Memphis to 34.2 percent in Baltimore. The greatest interarea variation in increases was for unskilled plant workers--from 28.2 percent in Boston to 45.1 percent in Denver.

1958-59 Earnings by Area and Industry

Pay levels were generally highest in the larger West Coast and North Central areas and lowest in the South. For example, office clerical pay in Detroit was 113 percent of the New York City level; Los Angeles-Long Beach, 108 percent; San Francisco-Oakland, 109 percent; and Chicago, 106 percent, respectively. At the lower end of the distribution, pay levels in New Orleans and Memphis were less than 90 percent of the New York City level.

Detroit also had the highest pay level for skilled maintenance workers, followed by four of the West Coast areas and Chicago. Atlanta, Dallas, and Memphis were lowest, with levels about 90 percent of the New York City average.

These wage differences among the 20 areas were greater for unskilled plant workers than for skilled maintenance and office workers.

In all the areas, earnings of office and plant workers tended to be higher in manufacturing than in nonmanufacturing industries. There were wide variations, however. In some nonmanufacturing industries such as public utilities and wholesale trade, earnings frequently equaled or exceeded manufacturing averages for comparable jobs in the same area.

Average earnings for women officeworkers, plant workers, draftsmen, and

[1] The detailed findings are to be available in Wages and Related Benefits, 20 Labor Markets, 1958-59 (forthcoming BLS Bull. 1240-22). See also: Job Pay Levels, Differentials, and Trends in 20 Labor Markets, Monthly Labor Review, October 1959, pp. 1120-1127.

women industrial nurses are shown in tables 1, 2, and 3. Table 4 shows relative pay levels for office and plant workers in the 20 areas. In this table, the New York City average is arbitrarily represented by 100 and all other areas are shown as percentages of the New York level.

It should be borne in mind, however, that the averages shown in the tables encompass a wide variation of pay rates. The rates for a single occupation may vary from one industry to another in an area, or even within an individual plant or office. Particularly in the case of officeworkers, length of service has considerable influence on individual pay rates. In addition, differences in survey timing among areas accounted for some of the interarea variation in the relative increases in earnings.

* * * * *

Complete reports on the occupational wage surveys discussed in this article are available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., or from the BLS regional offices listed on page 2. The bulletins are listed below.

Area	Survey date	Bull. No.	Price
Atlanta	May 1959	1240-19	20¢
Baltimore	August 1958	1240-2	25¢
Boston	October 1958	1240-6	25¢
Buffalo	September 1958	1240-3	25¢
Chicago	April 1959	1240-18	25¢
Dallas	October 1958	1240-5	25¢
Denver	December 1958	1240-7	20¢
Detroit	January 1959	1240-12	25¢
Los Angeles-Long Beach	March 1959	1240-15	25¢
Memphis	January 1959	1240-10	20¢
Milwaukee	April 1959	1240-16	20¢
Minneapolis-St. Paul	January 1959	1240-11	20¢
Newark-Jersey City	December 1958	1240-9	20¢
New Orleans	February 1959	1240-14	20¢
New York City	April 1959	1240-17	25¢
Philadelphia	November 1958	1240-8	30¢
Portland (Oreg.)	April 1959	1240-20	20¢
San Francisco-Oakland	January 1959	1240-13	25¢
Seattle	August 1958	1240-1	25¢
St. Louis	October 1958	1240-4	15¢

TABLE 1. Average Weekly Salaries[1] for Women in 14 Office Occupations, 20 Areas, Winter 1958-59

Area	Bookkeeping machine operators		Clerks, accounting		Clerks, file, class B	Clerks, payroll	Comptometer operators
	Class A	Class B	Class A	Class B			
Northeast:							
Boston	$64.50	$57.50	$72.00	$59.50	$49.00	$66.00	$59.50
Buffalo	71.00	53.00	80.00	63.50	54.50	71.50	66.50
Newark-Jersey City	74.50	60.00	81.50	64.00	52.50	75.00	71.00
New York City	76.50	66.00	84.00	66.50	55.00	77.50	70.50
Philadelphia	69.50	57.50	77.00	60.00	49.50	69.00	64.00
South:							
Atlanta	65.50	60.50	79.50	60.50	49.50	69.00	65.50
Baltimore	67.50	53.00	73.00	62.00	48.00	67.00	65.50
Dallas	68.50	57.00	75.00	59.50	48.50	67.50	64.50
Memphis	70.50	54.00	69.00	56.50	49.50	61.00	57.00
New Orleans	61.50	53.50	75.50	58.00	47.00	62.00	60.00
North Central:							
Chicago	82.00	70.00	87.00	70.00	57.50	79.00	74.00
Detroit	82.50	67.00	93.00	70.50	57.00	82.00	78.50
Milwaukee	74.00	61.50	83.00	64.50	56.00	70.00	63.00
Minneapolis-St. Paul	71.00	58.50	74.50	60.00	50.00	68.00	64.50
St. Louis	66.50	58.00	80.50	60.50	53.00	68.00	66.00
West:							
Denver	75.00	58.00	75.50	61.50	55.00	72.00	63.00
Los Angeles-Long Beach	85.50	64.00	86.50	71.50	58.00	82.50	80.50
Portland	80.00	61.50	81.00	70.00	50.50	73.00	70.00
San Francisco-Oakland	85.00	64.50	84.50	69.50	56.00	84.00	76.00
Seattle	72.50	61.00	76.50	68.00	58.50	75.50	68.50

Area	Key-punch operators	Office girls	Secretaries	Stenographers, general	Switchboard operators	Typists	
						Class A	Class B
Northeast:							
Boston	$60.00	$49.50	$76.00	$65.50	$61.50	$61.50	$54.50
Buffalo	67.50	54.00	82.50	72.00	65.00	69.50	58.50
Newark-Jersey City	65.50	55.00	85.50	70.00	68.00	66.50	57.50
New York City	65.50	52.00	88.00	71.00	70.00	67.50	60.00
Philadelphia	62.00	48.00	81.50	66.00	62.00	65.50	55.00
South:							
Atlanta	62.50	50.50	80.00	67.50	58.50	62.00	52.00
Baltimore	62.00	48.00	78.50	66.00	58.00	68.00	52.50
Dallas	61.00	48.50	79.00	69.00	56.00	61.50	52.50
Memphis	57.50	46.50	68.50	60.00	44.00	61.00	48.50
New Orleans	61.00	40.50	78.50	63.00	47.00	59.00	51.50
North Central:							
Chicago	72.00	59.00	89.50	75.50	70.50	72.50	63.50
Detroit	77.50	61.50	94.50	85.00	74.50	84.50	65.50
Milwaukee	65.50	51.00	85.50	68.50	63.00	69.50	58.50
Minneapolis-St. Paul	58.00	47.00	76.50	64.00	62.00	61.00	54.00
St. Louis	64.50	53.00	81.00	66.50	62.00	65.00	56.00
West:							
Denver	59.50	49.50	81.50	67.50	62.00	63.50	54.50
Los Angeles-Long Beach	77.50	59.50	90.50	78.50	73.50	74.00	62.50
Portland	70.50	49.00	83.00	71.50	62.00	65.50	58.00
San Francisco-Oakland	71.50	59.50	89.00	78.00	71.50	73.00	62.00
Seattle	70.50	52.50	85.00	74.00	66.50	67.50	57.00

[1] Average weekly salaries are earnings based on hours for which employees receive their regular straight-time salaries.

TABLE 2. Average Hourly Earnings[1] for Men in 14 Plant Occupations, 20 Areas, Winter 1958-59

Area	Carpenters, maintenance	Electricians, maintenance	Guards	Helpers, trades, maintenance	Janitors	Laborers, material handling	Machinists, maintenance
Northeast:							
Boston	$2.51	$2.58	$1.91	$2.01	$1.59	$1.81	$2.60
Buffalo	2.70	2.86	2.31	2.38	1.91	2.09	2.82
Newark-Jersey City	2.72	2.87	2.09	2.13	1.81	2.21	2.82
New York City	2.57	2.63	1.89	2.11	1.70	1.95	2.85
Philadelphia	2.65	2.69	1.65	2.21	1.66	1.93	2.70
South:							
Atlanta	2.27	2.71	2.19	1.80	1.22	1.53	2.50
Baltimore	2.52	2.62	2.02	2.13	1.46	1.85	2.90
Dallas	2.37	2.32	1.84	1.68	1.25	1.54	2.35
Memphis	2.11	2.53	1.95	1.63	1.19	1.40	2.49
New Orleans	2.26	2.69	1.41	1.82	1.05	1.47	2.66
North Central:							
Chicago	3.01	3.05	2.07	2.41	1.83	2.06	3.03
Detroit	2.90	3.07	2.45	2.40	1.99	2.24	3.06
Milwaukee	2.70	2.89	2.08	2.11	1.88	2.18	2.99
Minneapolis-St. Paul	2.81	2.89	2.06	2.27	1.72	2.14	2.82
St. Louis	2.74	2.91	2.10	2.43	1.62	1.98	2.93
West:							
Denver	2.65	2.67	2.00	1.96	1.54	2.02	2.62
Los Angeles-Long Beach	2.80	2.97	2.25	2.30	1.82	2.21	2.94
Portland	2.87	2.96	(3)	2.23	1.75	2.18	2.91
San Francisco-Oakland	2.97	3.04	1.93	2.45	2.02	2.32	3.02
Seattle	2.62	2.81	2.10	2.18	1.78	2.12	2.78

Area	Mechanics (auto), maintenance	Order fillers	Painters, maintenance	Tool and die makers[2]	Truckdrivers	Truckers, power (forklift)	Watchmen
Northeast:							
Boston	$2.25	$1.82	$2.22	$2.74	$2.19	$2.07	$1.57
Buffalo	2.51	2.24	2.57	2.98	2.40	2.31	1.71
Newark-Jersey City	2.48	2.13	2.59	2.86	2.67	2.28	1.68
New York City	2.52	1.97	2.33	2.87	2.66	2.44	1.75
Philadelphia	2.55	2.03	2.40	2.87	2.42	2.10	1.60
South:							
Atlanta	2.29	1.55	2.22	(3)	2.04	1.87	1.30
Baltimore	2.34	1.69	2.21	2.94	2.12	2.30	1.36
Dallas	2.23	1.55	2.18	2.72	1.85	1.73	1.25
Memphis	2.28	1.46	1.99	2.83	1.78	1.53	1.10
New Orleans	2.27	1.42	2.16	(3)	1.68	1.82	1.14
North Central:							
Chicago	2.83	2.09	3.01	3.16	2.63	2.30	1.42
Detroit	2.80	2.24	2.80	3.17	2.57	2.36	1.75
Milwaukee	2.65	2.14	2.78	3.16	2.51	2.33	1.63
Minneapolis-St. Paul	2.58	2.07	2.83	2.95	2.42	2.30	1.70
St. Louis	2.59	2.06	2.70	3.03	2.48	2.19	1.45
West:							
Denver	2.50	1.90	2.56	2.79	2.16	2.10	1.57
Los Angeles-Long Beach	2.76	2.22	2.71	3.00	2.54	2.37	1.86
Portland	2.65	2.16	2.94	(3)	2.40	2.26	1.87
San Francisco-Oakland	2.90	2.33	2.86	3.38	2.63	2.41	2.01
Seattle	2.61	2.12	2.68	3.03	2.42	2.21	1.89

[1]Average hourly earnings are straight-time hourly earnings, excluding premium pay for overtime and for work on weekends, holidays, and late shifts.

[2]Other than in tool and die jobbing shops.

[3]No data reported or data that do not meet publication criteria.

TABLE 3. Average Weekly Salaries[1] for Draftsmen and Industrial Nurses, 20 Areas, Winter 1958-59

Area	Draftsmen (men)			Industrial nurses (women)
	Leader	Senior	Junior	
Northeast:				
Boston	$149.00	$113.00	$84.50	$81.00
Buffalo	153.50	119.00	87.00	92.00
Newark-Jersey City	132.50	114.50	86.00	88.50
New York City	166.50	127.50	87.50	93.00
Philadelphia	149.00	109.00	81.50	85.00
South:				
Atlanta	151.00	110.50	82.50	90.00
Baltimore	138.50	112.00	77.00	89.00
Dallas	120.50	97.00	76.00	84.00
Memphis	(2)	108.00	72.50	80.00
New Orleans	(2)	111.50	81.00	84.50
North Central:				
Chicago	145.00	127.00	93.50	92.00
Detroit	(2)	136.50	96.00	98.00
Milwaukee	147.00	113.00	89.50	87.00
Minneapolis-St. Paul	(2)	108.00	84.50	85.00
St. Louis	146.50	115.50	89.00	85.00
West:				
Denver	150.50	128.50	82.50	82.50
Los Angeles-Long Beach	142.00	112.50	90.00	97.00
Portland	(2)	107.50	91.50	85.00
San Francisco-Oakland	132.50	112.50	90.00	94.00
Seattle	121.50	100.00	83.00	94.50

[1] Average weekly salaries are earnings based on hours for which employees receive their regular straight-time salaries.

[2] No data reported or data that do not meet publication criteria.

TABLE 4. Relative Pay Levels for Office[1] and Plant[2] Workers in 20 Labor Markets, Winter 1958-59

[New York City level = 100]

Area	Office	Skilled maintenance	Custodial	Material movement
Northeast:				
Boston	91	95	95	93
Buffalo	100	107	111	107
Newark-Jersey City	99	105	105	110
New York City	100	100	100	100
Philadelphia	94	101	95	99
South:				
Atlanta	92	91	75	81
Baltimore	93	101	87	94
Dallas	93	90	76	78
Memphis	84	89	72	73
New Orleans	87	95	62	73
North Central:				
Chicago	106	112	104	104
Detroit	113	115	114	112
Milwaukee	98	107	105	107
Minneapolis-St. Paul	91	105	102	106
St. Louis	95	108	96	103
West:				
Denver	94	101	95	98
Los Angeles-Long Beach	108	109	109	109
Portland	99	109	103	106
San Francisco-Oakland	107	114	119	115
Seattle	102	107	110	107

[1] These indexes are based on weekly salaries for the following occupations: Men--clerks, accounting, class A; clerks, accounting, class B; clerks, order; office boys; tabulating machine operators; Women--billers, machine (billing); bookkeeping machine operators, class B; clerks, accounting, class A; clerks, accounting, class B; clerks, file, class B; clerks, payroll; comptometer operators; keypunch operators; secretaries; stenographers, general; switchboard operators; typists, class A and class B.

[2] The indexes for the various plant-worker groups are based on data for the following occupations: Skilled maintenance--carpenters, electricians, machinists, mechanics-automotive and machine repairmen, and painters; Custodial--guards, janitors, janitresses, and watchmen; and Material Movement--forklift operators, material handling laborers, order fillers, shipping packers, shipping and receiving clerks, and truckdrivers.

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*This index will cover issues which supplement the 1959 edition of the Occupational Outlook Handbook. For index on previous issues of the Quarterly, see Vol. 3, No. 3, September 1959.

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